AMENDMENTS TO THE CLAIMS

1. (Currently amended) An RFID system comprising:

[[(A)]] a plurality of RFID transponders~~, each of said plurality of RFID transponders having a unique identification code, for receiving~~ configured to receive a signal and ~~for generating~~ and to generate a response signal based thereon, ~~each of~~ said RFID transponders having a random number generator ~~used for determining~~ usable to determine whether to respond to a received message addressed to ~~all of~~ said plurality of RFID transponders;

[[(B)]] a host computer ~~for generating~~ configured to generate a message for transmission to at least one of said RFID transponders; and

[[(C)]] at least one interrogator ~~connected~~ communicatively coupled to said host computer having an interrogator transmitter and an interrogator receiver which operate in half-duplex mode, wherein said interrogator transmitter ~~transmits~~ is capable to transmit messages received from said host computer to said plurality of RFID transponders during a first part of said half-duplex mode and ~~which provides~~ provide an illumination signal to said plurality of RFID transponders during a second part of said half-duplex mode, and said interrogator receiver ~~receives signals reflected~~ is capable to receive a signal generated by said at least one of said RFID transponders and ~~provides~~ provide said received ~~signals~~ signal to said host computer;

wherein said host computer ~~identifies each of said~~ is configured to identify a unique identification ~~codes~~ code associated with each of said plurality of RFID transponders by iteratively transmitting a message including a variable having a predetermined ~~initial~~ value to ~~each of~~ said RFID transponders, and only said RFID transponders which generate a random number greater than said variable respond to said message by transmitting the identification codes associated with said respective RFID transponders.

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2. (Currently amended) The RFID system of Claim 1, wherein ~~each of~~ said signals [[is]] are transmitted in spread spectrum format.

3. (Currently amended) The RFID system of Claim 1, wherein communications between said at least one interrogator and ~~each of~~ said plurality of RFID transponders is in TDMA format ~~whereby a predetermined~~ in which a number of time slots are available for transmission.

4. (Currently amended) The RFID system of Claim 3, wherein ~~each of~~ said RFID transponders which generate a random number greater than said variable are also configured to use said generated random variable to determine which time slot to use for transmission of said response signal.

5. (Currently amended) The RFID system of Claim 1, wherein said host computer is configured to intelligently ~~adjusts~~ adjust said variable after receipt of ~~each~~ a response signal to ensure that an adequate number of responses are received during a next iteration.

6. (Currently amended) The RFID system of Claim 1, wherein an RFID transponder is further configured to use said random number generator ~~is also used for generating~~ to generate a unique identification code ~~for each of said plurality of RFID transponders~~.

7. (Currently amended) A method for a host to read an identification code from a plurality of RFID transponders [[each]] having unique identification codes, comprising ~~the steps of~~:

[[(A)]] iteratively transmitting a read identification code command and a variable having a predetermined ~~initial~~ value from said host to said plurality of RFID transponders;

[[(B)]] receiving, at ~~each of~~ said plurality of RFID transponders, said read identification code command and said variable;

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[[(C)]] generating, at ~~each of~~ said plurality of RFID transponders, a random number ~~upon receipt of said read identification code and said variable~~;

[[(D)]] comparing, at ~~each of~~ said plurality of RFID transponders, said variable with said generated random number;

[[(E)]] transmitting, by ~~each of~~ said RFID transponders where said generated random number is greater than said variable, an identification code associated with ~~each~~ said RFID transponder and then becoming inactive such that ~~each~~ said RFID transponder does not respond to further read identification code commands during a current read identification code ~~command~~ ~~iteration~~ process;

[[(F)]] waiting, by ~~each of~~ said RFID transponders where said generated random number is not greater than said variable, for a next transmission of said read identification code command and said variable;

[[(G)]] intelligently adjusting, by said host, the value of said variable for the next transmission of said read identification code command and said variable; and

[[(H)]] examining said variable at said host and ceasing the iterative transmission of said read identification code command when no RFID transponders respond by transmitting their identification code in response to a final value of said variable.

8. (Currently amended) The method of Claim 7, wherein said predetermined value for said variable is set as a high value, said ~~step of~~ intelligently adjusting the value of said variable reduces the value of said variable, and wherein said final value is zero.

9. (Currently amended) A method for ~~re-selecting an~~ generating identification ~~code for each of~~ codes for a plurality of RFID transponders, comprising ~~the steps of~~:

[[(A)]] transmitting a re-select identification code command to ~~each of~~ a plurality of RFID transponders;

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[[(B)]] generating, at ~~each of~~ said plurality of RFID transponders, a first random number and calculating a new identification code based upon said random number;

[[(C)]] iteratively transmitting a read identification code command and a variable having a predetermined ~~initial~~ value from [[said]] a host to said plurality of RFID transponders;

[[(D)]] receiving, at ~~each of~~ said plurality of RFID transponders, said read identification code command and said variable;

[[(E)]] generating, at ~~each of~~ said plurality of RFID transponders, a random number ~~upon receipt of said read identification command and said variable~~;

[[(F)]] comparing, at ~~each of~~ said plurality of RFID transponders, said variable with said generated random number;

[[(G)]] transmitting, by ~~each of~~ said RFID transponders where said generated random number is greater than said variable, [[an]] the new identification code associated with ~~each~~ said RFID transponder and then becoming inactive such that ~~each~~ said RFID transponder does not respond to further read identification code commands during a current read identification code ~~command iteration~~ process;

[[(H)]] waiting, by ~~each of~~ said RFID transponders where said generated random number is not greater than said variable, for a next transmission of said read identification code command and said variable;

[[(I)]] intelligently adjusting, by said host, the value of said variable for the next transmission of said read identification code command and said variable; and

[[(J)]] examining said variable at said host and ceasing the iterative transmission of said read identification code command when no RFID transponders respond by transmitting their new identification code in response to a final value of said variable.

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10. (Currently amended) The method of Claim 9, wherein said predetermined value for said variable is set as a high value, said ~~step of~~ intelligently adjusting the value of said variable reduces the value of said variable, and wherein said final value is zero.

11. (Currently amended) An interrogator for communicating with an RFID transponder in an RFID system ~~which is connected to a host computer~~, comprising:

[[(A)]] at least one antenna;

[[(B)]] a transmitter ~~connected~~ <u>coupled</u> to said at least one antenna ~~for transmitting~~ <u>and configured to transmit</u> an FSK modulated spread spectrum signal on said at least one antenna during a transmitting mode and a BPSK modulated spread spectrum signal during a receiving mode;

[[(C)]] a receiver ~~connected~~ <u>coupled</u> to said at least one antenna ~~for receiving~~ <u>and configured to receive</u> a spread spectrum signal in PSK format[[,]]<u>;</u> and

[[(D)]] a controller ~~connected~~ <u>coupled</u> to said transmitter and said receiver ~~for controlling~~ <u>and configured to control</u> said transmitter and said receiver ~~and communicating with a host computer~~.

12. (Currently amended) The interrogator of Claim 11, wherein said at least one antenna comprises a first antenna having a first polarization and a second antenna having a second polarization which is orthogonal to said first polarization, and further comprising an antenna switch matrix ~~for selecting~~ <u>configured to select</u> one of said first antenna and second antenna for ~~connection~~ <u>coupling</u> to said transmitter and a second of said first antenna and said second antenna for ~~connection~~ <u>coupling</u> to said receiver.

13. (Currently amended) The interrogator of Claim 12, wherein said at least one antenna further comprises a third antenna having a third polarization which is orthogonal to said first polarization and to said second polarization, and said antenna switch ~~selects~~ <u>is configured to</u>

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select one of said first antenna, second antenna and third antenna for ~~connection~~ coupling to said transmitter and a second of said first antenna, second antenna and third antenna for ~~connection~~ coupling to said receiver.

14. (Currently amended) The interrogator of Claim 11, wherein said transmitter comprises:

an FSK transmitter section ~~for generating~~ configured to generate a message for transmission as a spread spectrum output signal in FSK format;

a BPSK transmitter section ~~for generating~~ configured to generate an illumination signal for transmission as a spread spectrum signal in BPSK format;

an output amplifier; and

a switch ~~which selectively connects~~ configured to selectively couple said FSK transmitter section or said BPSK transmitter section to said output amplifier.

15. (Currently amended) The interrogator of Claim 14, wherein said FSK transmitter section ~~consists of~~ comprises:

a Manchester encoder ~~connected~~ coupled to said controller;

a PN generator ~~connected~~ coupled to said controller; and

an FSK modulation generator ~~connected~~ coupled to said Manchester encoder and said PN generator.

16. (Currently amended) The interrogator of Claim 14, wherein said BPSK transmitter section ~~consists of~~ comprises:

a PN generator;

a low noise oscillator; and

a balanced modulator ~~connected~~ coupled to said PN generator and said low noise oscillator.

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17. (Currently amended) The interrogator of Claim 11, wherein said receiver comprises:

a band pass filter having an input ~~connected~~ coupled to said at least one antenna for receiving a signal;

a first mixer and a second mixer each having a first input ~~connected~~ coupled in parallel to an output of said band pass filter and a second input ~~connected~~ coupled to a signal derived from a transmitted signal;

a first bandpass filter ~~connected~~ coupled to an output of said first mixer;

a first data and clock recovery circuit ~~connected~~ coupled to an output of said first bandpass filter for recovering an in-phase version of said received signal;

a second bandpass filter ~~connected~~ coupled to an output of said second mixer; and

a second data and clock recovery circuit connected to an output of said second bandpass filter for recovering [[an]] a quadrature-phase version of said received signal.

18. (Currently amended) An antenna assembly for an RFID interrogator comprising:

[[(A)]] a first antenna having a first polarization;

[[(B)]] a second antenna having a second polarization which is orthogonal to said first polarization; and

[[(C)]] an antenna switch network ~~connected~~ coupled to said first and second antennas ~~for selectively selecting~~ and configured to selectively couple one of said first and said second antennas ~~for connection~~ to a transmitter and the other of said first and second antennas to a receiver.

19. (Currently amended) The antenna assembly of Claim 18, further comprising a third antenna having a third polarization which is orthogonal to both said first polarization and said second polarization, wherein the antenna switch network has six combinations in which to

couple one of the first, second, and third antennas to the transmitter and to couple another of the first, second, and third antennas to the receiver.

20. (Currently amended) A transponder for communicating with an interrogator in an RFID system, comprising:

[[(A)]] a first antenna element having a first predetermined dimensional configuration;

[[(B)]] a second antenna element having a second predetermined dimensional configuration;

[[(C)]] an impedance modulator ~~connected~~ coupled between said first antenna element and said second antenna element which causes said first antenna element to be electrically ~~connected~~ coupled to said second antenna element in a first state and to be electrically isolated from said second antenna element in a second state;

[[(D)]] a receiver ~~for receiving~~ configured to receive a message within an FSK modulated spread spectrum signal ~~connected~~, said receiver being coupled to said first antenna element, said second antenna element and said impedance modulator; and

[[(E)]] a controller ~~connected~~ coupled to said receiver ~~which receives~~,said controller being configured to receive said message and selectively ~~responds~~ respond to said message in PSK format by reflecting an illumination signal transmitted by said interrogator by selectively switching said impedance modulator between said first state and said second state.

21. (Currently amended) The transponder of Claim 20, wherein said receiver comprises:

[[(A)]] a frequency discriminator having an input ~~connected~~ coupled to said first and second antenna elements;

[[(B)]] a bandpass quantizer having an input connected to an output of said frequency discriminator; and

[[(C)]] a low pass filter connected to an output of said bandpass quantizer.

22. (Original) The transponder of Claim 20, wherein said first predetermined dimensional configuration is a length of one-quarter wavelength and said second predetermined dimensional configuration is a length of three-quarter wavelength.

23. (Currently amended) The transponder of Claim 22, wherein said first antenna element ~~consists of~~ is comprised of two first sub-elements ~~connected by~~ coupled at a ninety degree angle.

24. (Currently amended) The transponder of Claim 23, wherein ~~each of~~ said first sub-elements have a predetermined length relationship to each other.

25. (Currently amended) The transponder of Claim 22, wherein said second antenna element ~~consists of~~ is comprised of a plurality of second sub-elements ~~connected by~~ coupled at ninety degree angles in a geometrically folding configuration.

26. (Currently amended) The transponder of Claim 25, wherein ~~each of~~ said second sub-elements have a predetermined length relationship to each other.

27. (Original) The transponder of Claim 20, wherein said first antenna element and said second antenna element together form a dipole configuration.

28. (Currently amended) A method of generating a random number in an RFID transponder, comprising ~~the steps of~~:

[[(A)]] calculating a random seed based upon [[the]] a difference between a local clock signal and a clock signal derived from either a received signal or random noise;

[[(B)]] supplying said random seed to a random number generator; and

[[(C)]] generating a random number based upon said random seed.

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29. (Currently amended) An apparatus for generating a random number, comprising:

[[(A)]] a first clock input derived from a local clock oscillator;

[[(B)]] a second clock input derived from a received signal or random noise; and

[[(C)]] means ~~connected~~ coupled to said first clock input and said second clock input for generating a random number based upon [[the]] a timing difference between said first clock input and said second clock input.

30. (Currently amended) A method for controlling a plurality of groups of interrogators in an RFID system, comprising ~~the steps of~~:

arranging ~~each interrogator~~ interrogators within a group of interrogators in nearest neighbor format having a predetermined order; and

activating only corresponding interrogators within ~~each group~~ the groups of interrogators for transmission of signals to at least one RFID transponder within a zone covered by said respective activated interrogators.

31. (Canceled)

32. (Canceled)

33. (Currently amended) A method for a host having a plurality of transmitting antennas to read an identification code from a plurality of RFID transponders ~~each~~ having unique identification codes, comprising ~~the steps of~~:

[[(A)]] iteratively transmitting a read identification code command and a variable having a predetermined ~~initial~~ value from said host to said plurality of RFID transponders on each of said plurality of ~~transmitters~~ transmitting antennas;

[[(B)]] receiving, at ~~each of~~ said plurality of RFID transponders, said read identification code command and said variable;

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[[(C)]] generating, at ~~each of~~ said plurality of RFID transponders, a random number ~~upon receipt of said read identification code and said variable~~;

[[(D)]] comparing, at ~~each of~~ said plurality of RFID transponders, said variable with said generated random number;

[[(E))]]transmitting, by ~~each of~~ said RFID transponders where said generated random number is greater than said variable, an identification code associated with ~~each~~ said RFID transponder and then becoming inactive such that ~~each~~ said RFID transponder does not respond to further read identification code commands during a current read identification code ~~command iteration~~ process;

[[(F)]] waiting, by ~~each of~~ said RFID transponders where said generated random number is not greater than said variable, for a next transmission of said read identification code command and said variable;

[[(G)]] receiving at said host said transmitted identification codes associated with particular RFID transponders and storing said identification codes and associated antenna information in memory so that further communication with a particular one of said plurality of transponders is performed by using said identification code and said ~~antennal~~ antenna information;

[[(H)]] intelligently adjusting, by said host, the value of said variable for the next transmission of said read identification code command and said variable; and

[[(I)]] examining said variable at said host and ceasing the iterative transmission of said read identification code command when no RFID transponders respond by transmitting their identification code in response to a final value of said variable.

34. (Currently amended) An RFID system for tracking election ballots comprising:

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[[(A)]] a plurality of RFID transponders~~, each of said plurality of RFID transponders having a unique identification code and~~ connected to [[a]] separate ~~ballot~~ ballots, ~~for receiving~~ and configured to receive a signal and ~~for generating~~ to generate a response signal based thereon, ~~each of~~ said RFID transponders having a memory configured to store election data and a random number generator ~~used for determining~~ usable to determine whether to respond to a received message addressed to ~~all of~~ said plurality of RFID transponders ~~and a memory for storing election data~~;

[[(B)]] a host computer ~~for generating~~ configured to generate a message for transmission to at least one of said RFID transponders and ~~for controlling~~ control the storage of election data within ~~each of~~ the memory of said RFID transponders connected to said ballots; and

[[(C)]] at least one interrogator ~~connected~~ communicatively coupled to said host computer having an interrogator transmitter and an interrogator receiver which operate in half-duplex mode, wherein said interrogator transmitter ~~transmits~~ is capable to transmit messages received from said host computer to said plurality of RFID transponders during a first part of said half-duplex mode and ~~which provides~~ provide an illumination signal to said plurality of RFID transponders during a second part of said half-duplex mode and said interrogator receiver ~~receives signals reflected~~ is capable to receive a signal generated by said at least one of said RFID transponders and ~~provides~~ provide said received ~~signals~~ signal to said host computer;

wherein said host computer ~~identifies each of said~~ is configured to identify a unique identification ~~codes~~ code associated with each of said plurality of RFID transponders by iteratively transmitting a message including a variable having a predetermined ~~initial~~ value to ~~each of~~ said RFID transponders, and only said RFID transponders which generate a random

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number greater than said variable respond to said message by transmitting the identification codes associated with said respective RFID transponders.

35. (Currently amended) The RFID system of ~~Claim 1~~Claim 34, wherein said host computer selectively transmits a predetermined message which causes each RFID transponder receiving said predetermined message to transmit its identification code to said host computer.

36. (Currently amended) The RFID system of Claim 35, wherein said host computer is configured to continuously transmit said predetermined message ~~is continuously transmitted by said host computer~~ and ~~whereby~~ receipt of said identification code by said host signals an alarm event.

37. (Currently amended) In a communications system having a first device having a transmitter and a receiver and a plurality of second devices~~, each of said second devices~~ having a transmitter and a receiver, where communications between said first device and said plurality of second devices is in TDMA format having a plurality of time slots for transmission, a method for determining if more than one second device has transmitted a signal to said first device at the same time during a current TDMA communications period, comprising ~~the steps of~~:

[[(A)]] sampling the relative power in an analog baseband channel of said receiver in said first device during each of said time slots;

[[(B)]] sampling the relative power in an analog baseband channel of said receiver in said first device during a period of no communications;

[[(C)]] comparing said sampled relative power in each of said time slots to said sampled relative power in said period of no communications;

[[(D)]] setting, if said comparison for a particular one of said time slots produces a value of greater than unity by a predetermined amount, said particular time slot to be occupied;

[[(E)]] determining which of said time slots did not have an accepted message;

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[[(F)]] comparing said time slots which did not have an accepted message to said occupied time slots; and

[[(G)]] determining that each of said time slots which did not have an accepted message and which is occupied represents a time slot in which more than one second device transmitted a message at the same time.

38. (Currently amended) The interrogator of Claim 17, wherein said first data and clock recovery circuit comprises a first digital discrete phase lock loop circuit ~~that synchronizes~~ configured to synchronize to first signals input to said first data and clock recovery circuit, said second data and clock recovery circuit comprises a second digital discrete phase lock loop circuit ~~that synchronizes~~ configured to synchronize to second signals input to said ~~first~~ second data and clock recovery circuit, and said controller ~~chooses~~ is configured to choose between said in-phase version of said received signal and said quadrature-phase version of said received signal based upon which of said first and second digital discrete phase lock loop circuit first synchronizes to said first and second input signals, respectively.

39. (New) A transponder for communicating in an RFID system, comprising:

an antenna configured to receive a signal and to transmit a response signal that includes a unique identification code;

a receiver communicatively coupled to said antenna and configured to receive a message in a received signal, said message including a variable having a predetermined value;

a random number generator usable to determine whether to respond to a received message;

a transmitter coupled to said antenna and configured to generate the response signal; and

a controller coupled to said receiver, said random number generator, and said transmitter, wherein said controller is configured to obtain a random number from said random number

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generator and compare the random number to said variable in the received message, and if the random number is in a predetermined range relative to said variable, the controller is configured to cause the transmitter to generate and transmit the response signal.

40. (New) The transponder of Claim 39, wherein the predetermined range includes values that are greater than the value of the variable.

41. (New) The transponder of Claim 39, wherein the predetermined range includes values that are less than the value of the variable.

42. (New) The transponder of Claim 39, wherein the predetermined range includes a range of values that are greater than and less than the value of the variable.

43. (New) A method for communicating in an RFID system, comprising:

at a transponder in the RFID system:

receiving a read identification code command and a variable having a predetermined value;

generating a random number;

comparing the value of said variable with said random number;

if said random number is in a predetermined range relative to the value of said variable, transmitting a unique identification code associated with the transponder and then becoming inactive such that no further response to a read identification code command is transmitted during a current read identification code process; and

if said random number is not in the predetermined range relative to the value of said variable, waiting for a next communication of said read identification code command and said variable.

44. (New) The method of Claim 43, wherein the predetermined range includes values that are greater than the value of the variable.

45. (New) The method of Claim 44, further comprising:

intelligently reducing the value of said variable for the next communication of said read identification code command and said variable; and

ceasing the current read identification code process when no RFID transponders respond by transmitting their identification code in response to a read identification code command with a final value of said variable.

46. (New) The method of Claim 43, wherein the predetermined range includes values that are less than the value of the variable.

47. (New) The method of Claim 46, further comprising:

intelligently increasing the value of said variable for the next communication of said read identification code command and said variable; and

ceasing the current read identification code process when no RFID transponders respond by transmitting their identification code in response to a read identification code command with a final value of said variable.

48. (New) The method of Claim 43, wherein the predetermined range includes a range of values that are greater than and less than the value of the variable.

49. (New) The method of Claim 48, further comprising:

intelligently expanding the range of values that are greater than and less than the value of the variable for the next communication of said read identification code command and said variable; and

ceasing the current read identification code process when no RFID transponders respond by transmitting their identification code in response to a read identification code command with a final range of values relative to said variable.